3.2 AIR QUALITY

3.2.1 Existing Conditions

3.2.1.1 Climate

The Project site is located in a semi-arid region of south-central Washington, at the western edge of the Columbia Basin physiographic province, which includes the Kittitas Valley and the central plains area in the Columbia Basin south from the Waterville Plateau to the Oregon border, and east to near the Palouse River. The elevation increases from approximately 400 feet at the confluence of the Snake and Columbia Rivers to 1,300 feet near the Waterville Plateau and 1,800 feet along the eastern edge of the area. This large province occurs within the rain shadow of the Cascade mountain range, and is characterized by semi-arid conditions, as well as a large range of annual temperatures indicative of a continental climate. However, the relatively close proximity of the Pacific Ocean and the dominant westerly winds of the region combine to moderate the continental influence (Franklin and Dyrness 1988). Annual precipitation ranges from 7 inches in the drier localities along the southern slopes of the Saddle Mountains, Frenchman Hills and east of the Rattlesnake Mountains, to 15 inches in the vicinity of the Blue Mountains.

Summer precipitation is rare and usually associated with thunderstorms. During July and August, it is not unusual for four to six weeks to pass without measurable rainfall. The last freezing temperature in the spring occurs during the latter half of May in the colder localities of the Columbia Basin. The first freezing temperature in the fall is usually recorded between mid-September and mid-October. (Climate of Washington, Western Region Climate Center: [WRCC]).

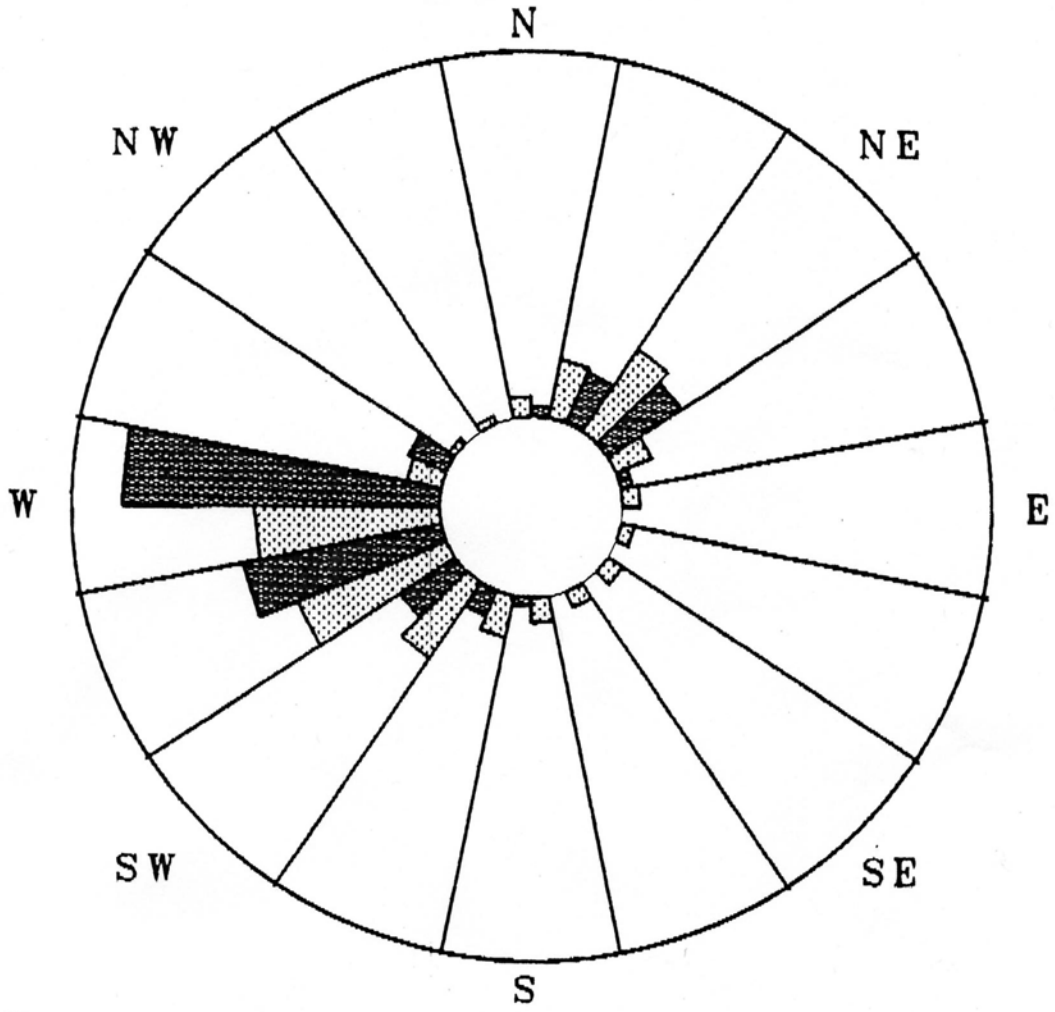
Wind Mechanism

The Wild Horse Wind Power Project site is located on several well exposed ridgelines, the largest is known as Whiskey Dick Mountain at 3,873 feet elevation. The ridges range in elevation from 3,000 feet to 3,873 feet. The ridges are about 15 miles east of Ellensburg and 10 miles west of the Columbia River. They are downwind of Snoqualmie Pass, the lowest pass through the Washington Cascades. Strong westerly winds are channeled through Snoqualmie Pass and the winds accelerate down the backside (eastern slopes) of the Cascades. The acceleration of winds down the back side of mountain passes is a well known phenomenon associated with stable flows, and is referred to as downslope acceleration. The most persistent winds occur in the spring and summer months when there is a strong temperature gradient between the cool Puget Sound and the hot dry Columbia plateau region. However, strong winds also occur in other months, and are associated with the passage of numerous cold fronts moving through the region.

The wind rose in Figure 3.2.1-1 was developed from four years of historical data at the Project site and shows the percent of time and energy in 16 compass points and indicates

that the prevailing winds blow from the west through west-southwesterly directions. The highest wind speeds are from westerly directions and generally occur in the spring through summer months. The black shading indicates the relative percent of turbine energy in each sector and the gray shading indicates the percent of time the winds blow from each direction.

Figure 3.2.1-1: Wind Energy Rose for Whiskey Dick Mountain



Ellensburg Temperature and Precipitation Statistics

The Ellensburg airport provides the longest term data set with information recordings from 1940 to present. The coldest average monthly temperatures at Ellensburg occur in January with a minimum of 15ºF, and a maximum of 32ºF. The warmest average monthly temperatures in Ellensburg occur in July, when the minimum is 54ºF and the maximum is 84ºF.

The average total annual precipitation at Ellensburg is 8.9 inches. Ellensburg's average annual snowfall is 35.2 inches. It should be noted that the highest point in the Project

area (Whiskey Dick Mountain at 3,873 feet elevation) is over 2,100 higher in elevation than the reporting station in Ellensburg. Therefore the Project area will experience slightly cooler temperatures than reported for the Ellensburg station.

Based on 63 years of data collection at the Ellensburg Airport, average climate conditions are presented in Table 3.2.1-1 below.

Table 3.2.1-1 Average Climate Conditions at Ellensburg Airport, 1940-2003

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	32	41	50	61	70	74	84	82	75	61	44	36	58.9
Average Min. Temperature (F)	15	22	27	34	43	49	54	53	45	36	27	22	35.6
Average Total Precipitation (in.)	1.3	0.8	0.7	0.5	0.6	0.7	0.2	0.3	0.5	0.7	1.3	1.2	8.91
Average Total SnowFall (in.)	13	6.2	2	0.1	0	0	0	0	0	0.1	5.5	8.2	35.2
Average Snow Depth (in.)	5	4	1	0	0	0	0	0	0	0	0	2	1

Period of Record: 5/4/1940 to 3/31/2003
Source: Western Regional Climate Center (http://www.wrcc.dri.edu) for Ellensburg Airport, Washington (452508).

Extreme Temperatures and Wind Gusts
Based on the same weather data set, the maximum recorded temperature was 103ºF and the minimum recorded temperature was -28ºF. Extreme gust wind speeds have been measured and calculated for Ellensburg in a report prepared by Wantz and Sinclair (1981) which indicates that the 100-year expected peak gust is 73 mph. The design case for all facility equipment, specifically the turbines and towers, are designed to withstand wind loads and temperatures far in excess of these extremes as described more fully in Section 2.2.3, 'Project Facilities'.

Air Stability and Humidity
A proxy for air stability at the site is represented by the sigma theta value, which is the standard deviation of wind direction. The sigma theta value for the Project site is 8.3 degrees. Site air stability is not relevant to air quality impacts because the Project will produce no air emissions during operations.

Mean annual humidity at the Ellensburg Airport in 2001 was 68%. It is assumed that this value is approximately the same for the Project site and indicative of site humidity levels, although on-site meteorological towers do not measure or record humidity. Humidity is generally not a design factor or performance consideration for wind power projects.

3.2.1.2 Air Quality Standards

Both the federal government (through EPA) and the state government (through the Washington Department of Ecology) regulate and permit sources of air emissions. In Kittitas County, the authority to regulate and permit sources of air emissions has been delegated to the Washington Department of Ecology's Central Regional Office. EPA has established National Ambient Air Quality Standards (NAAQS) for certain pollutants, which are air pollution concentration levels against which all areas of the country are evaluated. If an area meets the standards, it is an "Attainment Area" and if it does not, it is considered a "Nonattainment Area". The Project area (Kittitas County) air shed quality is classified as an Attainment area for particulate matter and as an Unclassified area for all other pollutants. Attainment means that the ambient air quality standards for particulate matter, as established by EPA, are met. Unclassified means that ambient air quality monitoring studies have not been completed. For air quality regulatory and permitting purposes, the "Unclassified" designation is the same as "attainment", so there are no special restrictions on permitting for the Wild Horse Project.

Applicable Air Quality Regulations
According to WAC 173-400-030 (37), "fugitive" air emissions are emissions that "do not and which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening." These emissions include fugitive dust from dirt or gravel roads, construction sites, and tilled land.

The air quality regulations applicable to fugitive dust emissions during construction and operation are as follows:

- WAC 173-400-040(1) Visible emissions, states that no person shall cause or permit the emission for more than three minutes, in any one hour, of an air contaminant from any emissions unit which at the emission point, or within a reasonable distance of the emission point, exceeds twenty percent opacity.

- WAC 173-400-040(2) Fallout, states that no person shall cause or permit the emission of particulate matter from any source to be deposited beyond the property under direct control of the owner or operator of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.

- WAC 173-400-040(3a) Fugitive emissions, states that the owner or operator of any emissions unit engaging in materials handling, construction, demolition or any other operation which is a source of fugitive emissions shall take reasonable precautions to prevent the release of air contaminants from the operation.

- WAC 173-400-040(5) Emissions detrimental to persons or property, states that no person shall cause or permit the emission of any air contaminant from any source if it is detrimental to the health, safety or welfare of any person, or causes damage to property or business.

- WAC 173-400-040(8a) Fugitive dust sources, states that the owner or operator of a source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions.

- WAC 173-400-035 states that portable sources such as a rock crusher and batch plant, which locate temporarily at particular sites, states that the owner(s) or operator(s) shall be allowed to operate at the temporary location providing that the owner(s) or operator(s) notifies the Department of Ecology (Ecology) or the local air quality authority of intent to operate at the new location at least 30 days prior to starting the operation, and supplies sufficient information to enable Ecology or the local air quality authority to determine that the operation will comply with the emission standards for a new source, and will not cause a violation of applicable ambient air quality standards and, if in a nonattainment area, will not interfere with scheduled attainment of ambient standards. The permission to operate shall be for a limited period of time (one year or less) and Ecology or the local air quality authority may set specific conditions for operation during that period. A temporary source shall be required to comply with all applicable emission standards.

Related Air Quality Permits

Exhibit 7 contains a copy of the Department of Ecology Temporary Air Quality Permit Application for Rock Crushing on Site. Compliance with Department of Ecology air quality regulations and standards will be ensured by implementing effective control measures and by complying with permit guidelines and statutory requirements addressing fugitive dust emissions. No Best Available Control Technology (BACT) analysis for the Project has been requested or performed.

3.2.2 Impacts of the Proposed Action

3.2.2.1 Construction

Typical Meteorological Conditions: Dry-Season Construction

A typical construction day at the Project site during the dry season (July) would have average westerly winds at 10-20 miles per hour, no precipitation, and an average daytime temperature of 78 degrees Fahrenheit. The summer wind mechanism displays a predictable pattern where wind speeds increase during the afternoon hours and reach peak wind speeds at 8 p.m. each evening before receding. This pattern will reduce airborne emissions because construction activities will typically end before 8pm when wind speeds reach their daily peak. It is important to note that the Project boundaries are surrounded by unpopulated areas with no downwind residences for approximately ten miles.

Emissions – Mobile Sources

Mobile sources (such as construction equipment and vehicles) are regulated separately under the federal Clean Air Act through vehicle inspection and maintenance programs and are not included when determining if a source must go through air emissions permitting.

Construction emissions are not included in permitting of stationary sources. Only emissions from operations are considered in the new source permitting program. Construction of the Project will result in mobile air emissions from the following sources:

- Exhaust from the diesel construction equipment used for Project site preparation, grading, excavation, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from diesel trucks used to deliver equipment, concrete, fuel, water and construction supplies to the construction site;
- Exhaust from vehicles used to transport workers and materials to and from and around the construction site;
- Exhaust from diesel-powered welding machines, electric generators, air compressors, etc.

These emissions will be similar in nature to those produced by any large construction project that involves heavy equipment and transportation of materials to a project site Table 3.2.2-1 contains a detailed list of equipment anticipated to be used during construction.

Table 3.2.2-1 Construction Vehicles On Site During Construction

Construction Phase	**Estimated Average # of Vehicles on Site**	**Duration (Approx. Months)**	**Approx. Hours/Day**
Site Prep & Road Const.			
Bulldozer	4	4	12
Dump truck	12	4	12
Excavator	4	4	12
Front end loader	4	4	12
Motor grader	4	4	12
Vibratory Roller	3	4	12
Water Truck	8	4	12
Fuel Truck	1	4	12
Foundations			
Backhoe	4	4	12
Crane & Boom Trucks	3	4	12
Concrete pump truck	2	4	12
Concrete truck	8	4	12

Drill Rigs	3	4	12
Dump truck	6	4	12
Track hoe Excavator	5	4	12
Front end loader	3	4	12
Small loaders	3	4	12
Transportation Trucks - materials	6	4	12
Water Truck	1	4	12
Fuel Truck	1	4	12
Electrical			
Cable Spool Trucks	5	5	12
Concrete Trucks	3	5	12
Boom Truck	3	5	12
Fork Truck to Offload Spools	2	5	12
Man lift bucket	2	5	12
Rock trencher	2	5	12
Transportation Trucks - materials	8	5	12
Winch truck	3	5	12
Substation & Interconnect			
Backhoe	3	4	12
Bulldozer	2	4	12
Concrete Trucks	4	4	12
Drill Rig	2	4	12
Dump truck	4	4	12
Man lift bucket truck	2	4	12
Trencher	2	4	12
Winch truck	1	4	12
Excavator	2	4	12
Wind Turbine Assembly & Erection			
Boom truck	4	5	12
Forklift	4	5	12
Rough terrain crane	5	5	12
Transportation Trucks - materials	20	5	12
Truck mounted crane	5	5	12

			12
Project Cleanup			
Dump truck	2	3	12
Front end loader	2	3	12
Motor grader	2	3	12
Transportation Trucks - materials/waste	3	3	12
Daily Construction Traffic			
Min. of 20 full size pickups, FedEx, UPS, and other delivery trucks, etc. daily	35	4	12

Emissions – Temporary Equipment Sources

Temporary equipment that will be based on site include a portable concrete batch plant and a portable rock crusher, which will be in operation during road building and foundation construction phases, approximately 6-8 months in duration. Both the batch plant and rock crusher will utilize diesel-powered generators during operations. The batch plant and rock crusher daily operating hours will be determined by construction requirements. Applicant anticipates that normal construction schedules will require operation approximately 10-12 hours per day, 6-7 days per week. Operating hours and days could vary according to construction requirements, available daylight conditions, weather conditions, or other contingencies. Please refer to Section 2.2.3, 'Project Facilities' for more details.

Emissions - Fugitive Dust Sources

The construction activities that could produce fugitive dust are presented below. A detailed construction schedule is being developed - these estimates reflect reasonable assumptions based on the currently available data.

- Fugitive dust from construction-related traffic during the dry season. The ranges for approximate numbers of each major category of diesel-powered construction equipment are provided in Table 3.2.2-1 above.
- Fugitive dust as a result of ground disturbance during the dry season. The length, width, and type of construction for haul roads are described in Section 2.2.3, 'Project Facilities'. The peak-daily earthmoving volume for roads and foundations is anticipated to be approximately 7,800 cubic yards.
- Fugitive dust from on-site gravel quarries and WTG foundations resulting from blasting and excavation activities. Peak-daily production from on-site quarries is anticipated to be approximately 30,000 tons. Peak-daily excavation from WTG foundations is anticipated to be approximately 1,000 cubic yards of material.

- Fugitive dust from portable rock crusher and batch plant operations. Peak-daily production from the portable rock crusher and concrete batch plant is anticipated to be approximately 30,000 tons and 700 cubic yards, respectively.
- Fugitive dust from activities associated with gravel-pit reclamation.

Fugitive Dust Control – General

In accordance with the various provisions of WAC 173-400-040 above, the Project will employ reasonable precautions to prevent fugitive dust from being airborne and shall maintain and operate equipment in a manner that minimizes emissions. Such methods include good housekeeping procedures, such as dust suppression on roads and areas around the crusher and batch plant to prevent buildup of fine materials. The Applicant will implement an effective dust control program to minimize any potential disturbance from construction-related dust. Dust suppression will be accomplished through application of either water or a water-based, environmentally safe dust palliative such as lignin, in accordance with the Proposed Dust Abatement Policy developed by Kittitas County Public Works Department (this draft policy has not been formally adopted by the Board of County Commissioners). The use of a dust palliative such as lignin would result in the use of substantially less water for dust suppression and therefore less traffic from water trucks to the construction site. The final decision regarding dust suppression techniques will be made by the EPC contractor in consultation with EFSEC.

Fugitive Dust Control - Rock Crusher and Batch Plant:

In accordance with WAC 173-400-035 emissions controls for stationary processing equipment are anticipated to include cyclones, fabric filters and/or wet spray systems. Dust control systems shall be in place and maintained in good operating condition during all periods of crusher and batch plant operation. A water mist will be applied as needed near all emission points along the crushing circuit to control dust. The crusher and batch plant may be shut down when the wind is strong enough that best efforts to keep dust from leaving the pit area are not effective. Stockpiles shall be located to minimize exposure to wind. During cement transfer to the silo, silo exhaust shall be controlled by a properly designed and operated fabric filter device (baghouse). These measures are anticipated to eliminate the possibility of dust plumes within the Project area.

Maximum daily controlled PM10 emissions from stationary equipment are estimated to be approximately 200 lbs. Total Project PM10 emissions from stationary equipment during construction are estimated to be 2 tons. Estimated water quantities required for dust control have been included in total water requirements in Section 3.3, 'Water Resources'. These estimates reflect reasonable assumptions based on the currently available data.

Fugitive Dust Control - Reclamation Activities:

Dust suppression activities undertaken during construction will be resumed as appropriate during rehabilitation activities at gravel quarries, batch plant and rock crusher locations.

Odor
Odor emissions from the Project are limited to odors associated with exhaust from diesel equipment and vehicles. Given the strong prevailing west-northwesterly winds at the Project site and the fact that the nearest downwind houses or other sensitive receptors are located approximately ten miles from the Project site, no odor impacts are anticipated.

3.2.2.2 Operation

Emissions
Operation of the Project will produce no air emissions as no fuel is being burned to produce energy. Operation of the Project will therefore have no negative impact on air quality. To the extent that the Project displaces other, fossil-fuel fired power plants, it will have a positive effect on air quality.

Fugitive Dust Sources
Operation of the Project will result in minimal increases in fugitive dust levels. Project-related traffic increases on gravel access roads will generate small amounts of additional fugitive dust. This increased traffic is expected to consist largely of weekly or less frequent trips to turbines in service vehicles for maintenance and repair activities. Upgrading existing roads from dirt to gravel surfaces will result in some reduction in dust levels from current traffic on existing dirt roads.

Odor
Operation of the Project will create no odors as no combustion is involved and no odor-producing materials are used in Project operations.

3.2.3 Comparison of Impacts of Proposed Scenarios

Under the different design scenarios, there are no significant changes to air emissions volumes, fugitive dust levels, numbers of construction vehicles, or anticipated daily construction hours. This is because the road, underground trench, and overhead collector line lengths are unchanged under each scenario. It is also because the Large WTG Scenario requires excavation of larger foundations for a smaller number of WTGs while the Small WTG Scenario requires excavation of smaller foundations for a larger number of WTGs. Therefore, the requirements for blasting, rock crushing, earthmoving, and gravel are substantially similar under each scenario.

3.2.4 Impacts of the No Action Alternative

Under the No Action Alternative, the Project would not be constructed or operated, and the environmental impacts described in this ASC would not occur. The No Action Alternative assumes that future development would comply with existing zoning requirements for the Project area, which is zoned Commercial Agriculture and Forest and

Range. According to the County's zoning code, the Commercial Agriculture zone is dominated by farming, ranching, and rural lifestyles, and permitted uses include residential, green houses and agricultural practices. Permitted uses in the Forest and Range zone include logging, mining, quarrying, and agricultural practices, as well as residential uses (Kittitas County 1991). However, if the proposed Project is not constructed, it is likely that the region's need for power would be addressed by user-end energy efficiency and conservation measures, by existing power generation sources, or by the development of new renewable and non-renewable generation sources. Baseload demand would likely be filled through expansion of existing, or development of new, thermal generation such as gas-fired combustion turbine technology. Such development could occur at conducive locations throughout the state of Washington.

A baseload natural gas-fired combustion turbine would have to generate 67 average MW of energy to replace an equivalent amount of power generated by the project (204 MW at 33% net capacity). (An average MW or "aMW" is the average amount of energy supplied over a specified period of time, in contrast to "MW," which indicates the maximum or peak output [capacity] that can be supplied for a short period.) See Section 2.3, 'Alternatives'.

3.2.5 Mitigation Measures

The following mitigation measures for construction-related air emissions and dust are proposed:

- All vehicles used during construction will comply with applicable Federal and state air quality regulations;
- Operational measures such as limiting engine idling time and shutting down equipment when not in use will be implemented;
- Active dust suppression will be implemented on unpaved construction access roads, parking areas and staging areas, possibly using water-based dust suppression materials in compliance with state and local regulations;
- Dust suppression around batch plant and rock crushing facilities to prevent buildup of fine materials;
- Traffic speeds on unpaved access roads will be kept to 25 mph to minimize generation of dust;
- Carpooling among construction workers will be encouraged to minimize construction-related traffic and associated emissions;
- Disturbed areas will be replanted or graveled to reduce wind-blown dust;
- Erosion control measures will be implemented to limit deposition of silt to roadways.

No mitigation is proposed for Project operations as there will be no air or odor emissions.

3.2.6 Significant Unavoidable Adverse Impacts

There are no significant unavoidable adverse impacts with regard to air quality.